Multi-Lane Free Flow (MLFF) Tolling in India

A comprehensive overview of India's barrier-less tolling system for policy makers and transport authorities

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Understanding MLFF Tolling

Multi-Lane Free Flow (MLFF) represents a transformative shift from traditional toll collection, enabling vehicles to pass at highway speeds whilst tolls are collected digitally without stopping.

No Barriers

No toll booths or lane barriers – continuous traffic flow up to 80 km/h

Automated ID

Vehicle identification through RFID and automatic number plate recognition

Digital Billing

Automated toll deduction from FASTag account with enforcement mechanisms

MLFF System Architecture

Field Infrastructure

Gantries equipped with RFID readers, ANPR cameras (front & rear), laser/classification sensors (LIDAR), and high-speed data capture systems (RADAR)

Backend Systems

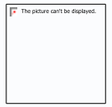
Toll Transaction Processing System (TTPS), Violation Enforcement System (VES), and Clearing & Settlement System

Integration Systems

Connection to FASTag issuing banks, NPCI payment gateway, and VAHAN/SARATHI databases

Communication Layer

High-speed fibre network with redundant connectivity through 4G/5G for reliability



Enforcement Layer

E-challan issuance, blacklisting mechanisms, and legal recovery workflows

Current Status: India 2025–26

1 **Pilot Launch (2025)**

First MLFF system deployed at Choryasi Toll Plaza on NH-48, Gujarat

2 **Second Pilot**

Additional system installed at Gharaunda Toll Plaza in Haryana

3 **Initial Rollout (FY26)**

~25 toll plazas planned for deployment with 16 already awarded

4 **Expansion Phase**

5 additional barrier-free projects awarded for accelerated implementation

National vision targets pan-India MLFF rollout by end-2026, led by NHAI and IHMCL with bank-led acquiring model for ETC settlement

What MLFF Changes for India's Tolling System

Policy Modernization

Moves tolling from plazas to a digital, network-based model with stronger audit trails

Contract Redesign

Updates concession agreements with technology-upgrade requirements and compensation terms

Stronger Revenue Assurance

Reduces leakages, improves transparency, and supports a scalable national system

MLFF is more than a technology upgrade — it is a systemic shift in how India collects tolls, manages compliance, and modernizes highway operations.

Three-Phase MLFF Transition Plan

Phase I: Hybrid Operations

Keep physical barriers open. Use FASTag as the primary tolling method and GNSS for validation.

Phase II: Barrier-Free Tolling

Remove physical booths and rely on gantries. Make GNSS the primary billing system.

Phase III: Full National Rollout

Adopt distance-based, pay-as-you-use tolling as the national standard across all highway sections.

Mandates & Implementation Timeline

Pilot MLFF Launch

2025 – Choryasi and Gharaunda pilots operational

Initial Rollout

FY 2025–26 – ~25 toll plazas deployed

Expansion Phase

2026 – Accelerated nationwide deployment

Full Barrier-Free Vision

By end-2026 – Pan-India MLFF coverage

New Project Mandates

Greenfield BOT Projects

MLFF implementation from Day 1 of project commissioning

TOT Projects

Transition to MLFF within 1 year of commercial operation date

FASTag Ecosystem Integration

Seamless Evolution

- MLFF is an evolution of FASTag, not a replacement.
- FASTag remains the primary payment instrument whilst MLFF adds enforcement, automation, and analytics layers.

Key Integration Points

- RFID read with ANPR fallback for reliability
- Integration with VAHAN vehicle registry
- Connection to bank issuers and NPCI ecosystem
- Centralised clearing via IHMCL clearing house

One Vehicle One FASTag

Strict enforcement to prevent misuse and ensure accurate billing

VAHAN Linkage

Direct connection to national vehicle database for authenticity

Penalty for Loose Tags

Sanctions imposed for unauthorised or improperly attached FASTags

Operational Risks and Safeguards

Revenue Leakage

Risk: Non-OBU vehicles may evade toll payment

Mitigation: Enforce payment with VAHAN registry checks and high-speed ANPR cameras

Data Privacy

Risk: Vehicle tracking data raises privacy concerns

Mitigation: Meet Digital Personal Data Protection Act compliance standards

System Downtime

Risk: Technical failures can disrupt operations

Mitigation: Use redundant power and a 2-hour repair SLA

Fake Number Plates

Risk: Counterfeit plates can bypass detection

Mitigation: Verify FASTag ID, ANPR data, and vehicle identity across multiple points

Operational Risks & Mitigation: Part 1

Revenue Leakage

Key Risks:

- Tag not read or tampering attempts
- Number plate recognition errors
- Data transmission failures

Dual Capture System

RFID + ANPR combination ensures redundancy and accuracy

AI Validation Engines

Machine learning algorithms cross-verify identification

Audit Trails

Comprehensive logging for transparency and accountability

Operational Risks & Mitigation: Part 2

Non-Payment & Violations

Key Challenges:

- Insufficient FASTag balance
- Intentional evasion attempts
- Unauthorised tag usage

1

E-Challan Integration

Automated violation notices sent to vehicle owners with payment links

2

RC Transfer Blocking

Prevent vehicle ownership transfer until toll dues are cleared

3

Penalty Multipliers

Progressive fines discourage repeat violations and ensure compliance

Operational Risks & Mitigation: Part 3

Technology Failure

Risks: Camera downtime, connectivity issues, power failures

Mitigation: Redundancy systems, edge processing capabilities, failover protocols, and backup power supplies

Data Accuracy Issues

Risks: Misclassification of vehicle class, incorrect toll calculation

Mitigation: AI-based classification algorithms, periodic calibration, manual review processes

MLFF implementation requires robust risk management strategies combining technology redundancy, enforcement mechanisms, and continuous monitoring to ensure revenue protection and operational efficiency

Policy Framework & Regulatory Anchors

01

Ministry of Road Transport & Highways (MoRTH)

Overall policy direction and rule amendments

02

National Highways Authority of India (NHAI)

Implementation oversight and project monitoring

03

IHMCL Operational Guidelines

Technology standards and clearing house operations

Mandatory FASTag Regime

FASTag penetration has exceeded 95% across national highways, creating the foundation for MLFF rollout. Central Motor Vehicles Rules (2026) amendments mandate clearance of toll dues before vehicle transfer and fitness renewal.

1

E-Challan Integration

Automated violation notices

2

Legal Recovery

Penalty enforcement mechanisms

Policy levels gaps, and proposed mitigation measures

01

Current approach is pilot-led and circular-based, not a unified national MLFF policy covering public funded and BOT/ TOT projects

02

No codified standards covering: ANPR accuracy thresholds, Enforcement mechanisms, Dispute resolution protocols

03

Protection of concessionaires against the revenue risk in case of Un-paid user fee.

Proposed mitigation measures

- ✓ Issue a **National MLFF Policy / Master Framework** covering Unified Technology standards (ANPR + RFID hybrid) across India
- ✓ Stronger Enforcement rules (penalty, blacklisting, legal recovery)
- ✓ Amend **Motor Vehicles Act / NH Fee Rules** to treat toll evasion as a **traffic offence**
- ✓ Link with the VAHAN database with the State RTO enforcement mechanism